A Clinical Telemedicine Consultation System Incorporating Evaluative Research

Camille A. Motta, M.S., Edward Gomez, M.D., Cheryl Naulty, M.D., Rebecca K. LaChance, D.N.S., Ronald Poropatich, M.D., Marshall R. Micheals, Daniel Robie, M.D., Bryan Darling, M.D., Robert Parry, M.D., Margaret Cannon, R.N., Jennifer Richter
Walter Reed Army Medical Center, Washington, D.C.

Background. The Department of Defense-funded, Project A/D Med, has among its missions, the development of a telemedicine and medical informatics network in support of telemedical consultation, and the management and transfer of medical data among the Walter Reed Army Medical Center and selected North Atlantic Regional Medical Command medical treatment facilities. One of the goals of the project is to establish a cost-effective telemedicine system, composed of commercial, off-the-shelf products and designed for physicians' to utilize on their desk-tops. The second goal of the project, spurred by recent reports citing the need for systematic, empirical study of the efficiency and effectiveness of telemedicine technology,[1,2] is to incorporate systematic planning for evaluation from the onset. This is one of the first controlled clinical trials testing the utility of this technology and the first to test this technology for surgical consultations involving acute-care neonates.

System. The chosen platform is the Apple Macintosh Power PC System due to its excellent graphics capability, its ability to accommodate both live, interactive video tele-conferences (VTCs) as well as the transmission of stored, digitized data (S&F), and built-in network communications capability based on the TCP/IP standards. Apple's Quicktime video-conferencing capability features ease of use, ability to send and receive document images during a video-conference, white board capability, and cross-platform conferencing. In addition, the system offers the ability to "capture" and immediately digitize images taken with attached cameras. Telecommunications needs are met by dedicated ISDN lines for VTCs and commercial Internet service via ISDN for S&F consults and database access. For S&F consults, images are sent as e-mail attachments via the Internet.

The electronic clinical consultation system was created using Claris Corporation's Filemaker Pro 3.0 relational database software program, which also offers TCP/IP network protocol support. Since there is no standard, generally-accepted telemedicine consultation form, a generic telemedicine electronic, clinical consultation system was designed for use in a variety of specialty consultations, based on the standard military form SF513 consultation sheet. Features include: active patient listing, search feature which facilitates finding specific cases, consult response screens designed for SOAP (Subjective, Objective, Assessment and Plan), alerting system using different colored arrows to indicate that the consultant is requesting additional information or to indicate that the requested information has been provided, dialog boxes in which attending physicians and consultants may record and send remarks back and forth, and a research database listing which is dynamically maintained on the system. The following system features reflect the tight integration of the evaluation component into the telemedicine project: pop-up screen notices prompting users to follow given steps of the research protocol, system-generated alerts to complete the research forms and case cannot be flagged "complete" unless the research forms are submitted

Evaluation. A prospective, controlled experiment is being conducted, in which subjects are randomly assigned to "treatment" (telemedicine consultation) groups or to a "control" (conventional consultation) group. Both VTC consults and S&F consults are being evaluated. Two research instruments have been designed, one for the attending physicians and another for the consultants, which collect data for both conventional and the telemedicine consults. The instrument is based on proven reliable and valid measures used in the information systems field. The measures are being used to test a telemedicine technology acceptance model and to examine constructs specified in the Joint Working Group on Telemedicine's analytic framework.

References

1.Grigsby, J.,Schlenker, R.E., Kaehny, M.M., et al. Analysis of Expansion of Access to Care Through Use of Telemedicine, Report 4 : Study Summary and Recommendations for Further Research. Denver, Center For Health Policy Research, Dec. 1994.
2. Institute of Medicine (U.S.). Committee on Evaluating Clinical Applications of Telemedicine. Telemedicine: A guide to assessing telecommunications in health care. Washington, DC: National Academy Press. 1996

The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

1091—8280/97/$5.00